U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL WEATHER SERVICE
NATIONAL METEOROLOGICAL CENTER

OFFICE NOTE 195

NMC 10-Day Rotating Archives

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JANUARY 1979

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Introduction:

In order to verify forecasts in any sort of routine operational framework, it is, obviously, necessary to save those forecasts at least until such time as the verifying observations arrive. Such is the function of various archiving or "run history" data sets that exist at NMC. A somewhat outdated (and incomplete) listing of these can be found in NMC Office Note 108. (A revision to O.N. 108 is in preparation by Automation Division).

At the present time there are in effect two types of such archives: Those that reside on magnetic tape (the "run history" tapes) and those that are found on either mountable or permanently mounted disk packs. The "run history" tapes contain, as their name implies, a complete collection of almost all the data and fields input to (and output from) the major forecast model runs. There are sets of 62 tapes (one each for the 00Z and 12Z cycles of each day of the month) for the REGIONAL (Cressman analysis and LFM II), OPERATIONAL (Hough analysis and 7LPE), and FINAL (OI analysis and 9L GLOBAL) runs, a grand total of 186 tapes. (Their data set names and contents are detailed in O.N. 108, and the forthcoming revision).

There are a considerable number of archive data sets on disks, established over the years for various purposes. For use as a source of information for routine verifications they have turned out to be rather cumbersome and somewhat incomplete: getting the particular field you may want is not the simplest task around; and more importantly it is quite inconvient to add new fields to those archives.

The run history tapes do contain all the forecast information one would want to verify, but the use of tapes during operational job streams is severely frowned upon.

All of this lead us to establish a new set of archive data sets combining the best features of the current ones while eliminating undesirable features as much as possible.

The 10 Day Rotating Archives

There now exists a set of 20 archive files for each routinely run NMC analysis and forecast system. At the present time these systems are:

. RADAT (Hough analysis; barotropic model)

. REGIONAL (Cressman analysis, LFM II model)

. HEMISPHERIC (Hough analysis; 7LPE model)

. GLOBAL (OI analysis; 9L GLO model)

. VAN's MODEL (Hough Analysis; 3 layer PE model)

. FINAL BAROTROPIC (Hough Analysis; barotropic model)

(Needless to say, changes occur from time to time).

Of the 20 files associated with each analysis and forecast system, one half contain the analyses and forecasts based on the 00 GMT synoptic observation time, the other half those from the 12Z time. Those 10 files (for either 00Z and 12Z initial time) contain the data for the most recent 10 days - everyday a 10-day-old file will be overwritten with today's analysis and forecast material. Thus the name "10 day rotating archive".

The archive files are, of course, uniquely named and are catalogued in the IBM 360/195 system. (The files all reside on mountable disk NWS217, if that makes any difference to anyone).

The naming system is

DSN=NWS.NMC.ARCHttnn.sys,DISP=SHR

where: tt='00' or "12" depending upon the GMT cycle;

nn=a number from 01 to 10 depending upon the date (see below);

sys=a three character name for the particular system:

SYSTEM	"sys"
RADAT	BT1
REGIONAL	REG
HEMISPHERIC	HEM
GLOBAL	GLO
VAN's MODEL	G3L
FINAL BAROTROPIC	BT2

(Not very imaginative names, I fear, but at least they are mnemonic, to some extent).

The association of nn (01, 02, ... 10) with a particular date is specific: For a given date you compute the day of the century (NMC subroutine W3FS17 will do that for you), obtain the remainder after division by 10 (the

FORTRAN MOD function does that for you) and add 1 to that remainder (you'll have to do that for yourself). Speaking in FORTRAN (rather than english) if NY, NM, ND are the (INTEGER*4) year of the century (e.g. 78, not 1978), month and day of month, respectively, this code fragment will give you nn:

```
CALL W3FS17 (NY,NM,ND,NCEN)
NN=MOD(NCEN,10) +1
```

NN (or nn) could then be used to construct a ddname which in turn would be associated (via a DD card) with the appropriate data set for that day. A caveat: because of the vagaries of computer systems (and the people that code for them) there can be no guarantee that the contents of a particular data set, identified by a particular date value of tt and nn, are indeed the fields appropriate to that date. They may be the data from 10 days prior to the sought after date (or 20 or 30 ...). The wise user of these archives will check the date record from the archive file against the date he started with and used to construct tt and nn.

Which finally brings us to the actual contents of the files. All of them conform to the NMC Office Notes 84 and 85 standards for random access files accessable via the W3FKxx routines (or my function IG255F). The maximum number of entries is 255, again a sort of NMC standard.

The meteorological content varies with the particular analysis/forecast system; here is what's there now (additional fields can be added with ease):

TABLE

10 Day Archive
Files

System	Contents
RADAT (BT1)	Both 00Z and 12Z cycles: 50.0 kPa heights; Analysis, 12, 24, 36, 48 hr forecasts; All on grid K=27 (See O.N. 84).
REGIONAL (REG)	Both 00Z and 12Z cycles: 100 Kpa heights, sea level pressure; 85, 50, 25, 10 kPa heights, temperatures, u and v wind components; 85, 50 kPa relative humidity; Tropopause pressure, accumulated precipitation; Analysis on grid k=5; 12, 24, 36, 48 hr forecasts on K=26.
HEMISPHERIC (HEM)	Same as REG except: *All fields on grid K=27; *At 00Z forecasts include 60, 72 and 84 hr forecasts; *At 00Z the 50 kPa heights from barotropic extension to hours 96 through 168 (12 hr steps) included *At 12Z forecasts to 60 hr only.
GLOBAL (GLO)	Same as REG except: *Sea level pressure and tropopause pressure for analysis only; *No accumulated precipitation; *Analysis and 12 hr forecast only; *Fields on grids K=27, 29 and 30.
Van's MODEL (G3L)	Analysis and Forecasts from 12Z only; 100 kPa heights; sea level pressure; 85, 50 and 250 kPa heights, temperatures, u and v winds; 85, 50 kPa relative humidity; Analysis, 24 hr and 48 hr forecasts; Fields on grid K=45 and 46.
FINAL BAROTROPIC (BT2)	Same as BT1 except run at 00Z only.

In general, the fields saved are those directly verifiable from observations, which is what the archives were established for.